IMPORTANT TERMS:

- **Component**
- **Projectile**
- **Resolution**
- **Resultant**
- **Satellite**
- **Scalar quantity**
- **Vector**
- **Vector quantity**

UNIT I: MECHANICS
Chapter 5: Projectile Motion

I. Vector and Scalar Quantities (5-1)

A. ***Vector Quantity***– describes both

1. Includes quantities like _____ (speed and direction), and _____

2. speed is _____ of velocity vector

B. ***Scalar Quantity***– specified by _____ only

1. can be added, subtracted, multiplied, and divided like ordinary numbers

2. includes:

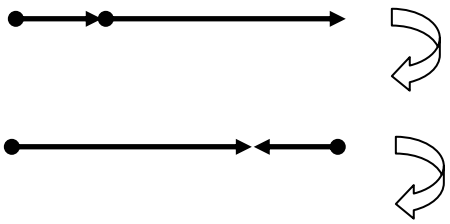
II. Velocity Vectors (5.2)

A. An _____ is used to represent the ***magnitude*** and ***direction*** of a vector quantity.

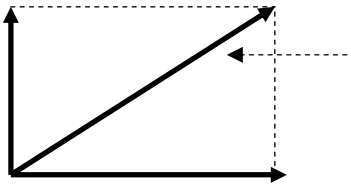
1. **Length of arrow** (drawn to scale) indicates-

2. **Direction of arrow** indicates **direction** of vector quantity

B. ***Parallel vectors***– simple to add or subtract



C. Combining vectors that are NOT parallel



1. Result of adding two vectors called the _____

2. Resultant of two **perpendicular** vectors is the _____ of the rectangle with the two vectors as sides

3. Use simple three step technique to find resultant of a pair of vectors that are at _____ **angles** to each other.

a. **First**–

b. **Second**-draw a _____ projection of each vector with dashed lines to form a rectangle

c. **Third**-draw the _____ from the

point where the two tails are _____

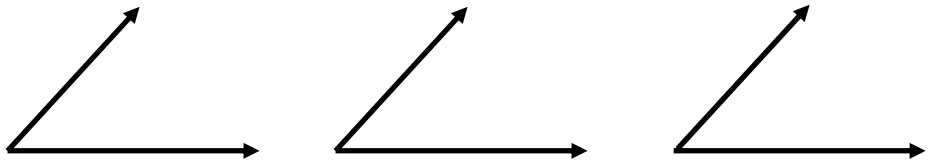
Step 1 ***Step 2*** ***Step 3***

4. Adding vectors not at right angles

a. Construct _____

b. Construct with two vectors as sides

c. Resultant is the _____



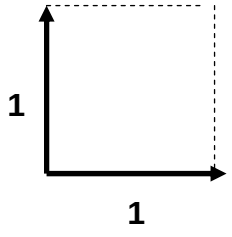
5. Adding vectors when parallelogram is a square (two vectors of equal length and at right angles to each other)

a. Construct a _____

b. The length of diagonal is _____ or

_____ times either of the sides

c. Resultant is _____ times either of the vectors



III. Components of Vectors (5.3)

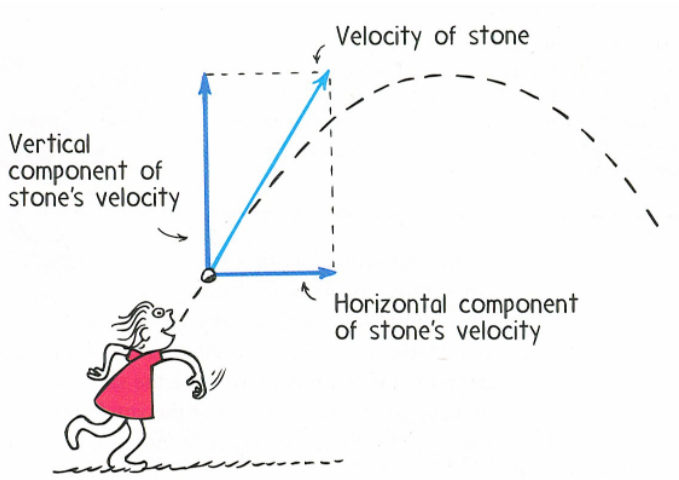
A. Technique to determine the vectors that made up a resultant vector (working backwards)

1. Any vector can be "_____" into two _____ vectors at _____ angles to each other

a. These two vectors are called _____

b. Process of determining components is called _____

c. can resolve into _____ and _____ components



IV. Projectile Motion (5.4)

A. ***projectile***-any object that moves through the air or through space, acted on only by _____ (and air resistance, if any)

1. follow _____ path near Earth's surface

2. Can look at vertical and horizontal components separately.

a. **Horizontal component** for projectile same as ball rolling freely along a level surface (when friction is negligible). Has _____ horizontal velocity

1). Covers equal _____ in equal _____ interval

2). With no horizontal force acting on ball there is no horizontal acceleration (same for a projectile)

b. Vertical component of a projectile's velocity is like motion of free falling object.

1). Only force in vertical direction is

_____

2). Vertical component changes with

_____.

c. horizontal and vertical components are completely _____ of each other.

1). Combine to produce variety of curved paths that projectiles follow.

3. Path of projectile accelerating in the vertical with constant horizontal velocity forms a

_____

4. When air resistances small enough to neglect (slow moving or heavy projectiles) the curved path are ***parabolic***

V. Projectiles Launched Horizontally (5.5)

A. **Horizontal motion** is _____

1.Horizontal component **constant** (moves same horizontal distance in equal _____ intervals)

2. **No horizontal component** of _____ acting on it

B. **Gravity** only acts _____

1. object _____ downward

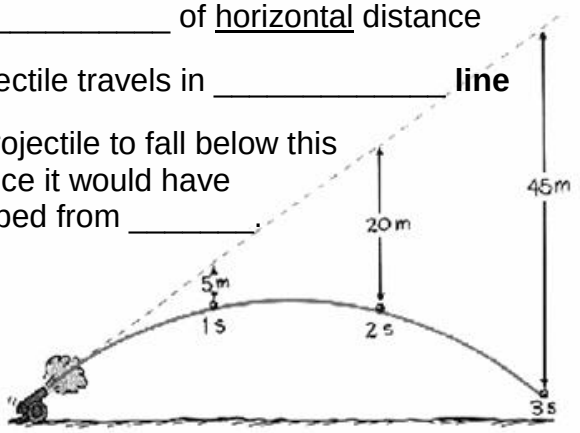
2. **Downward motion** of horizontally launched projectile is the same as that for _____ _____

VI. Projectiles Launched at an Angle (5.6)

A. Vertical distance _____ of horizontal distance

1. If **no gravity** projectile travels in _____ **line**

2. Gravity causes projectile to fall below this line the same distance it would have fallen if it were dropped from _____.

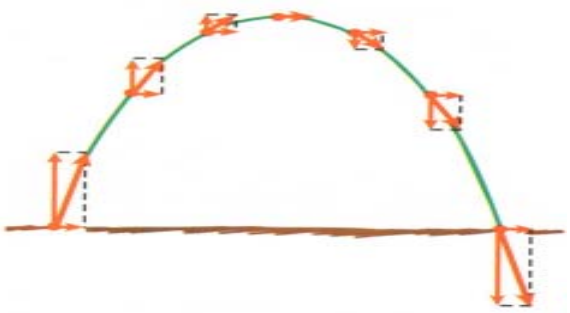


3. Distance below line calculated with **equation**

B. Height

1. Vertical distance a projectile falls below an imaginary straight line path _____ continually with _____

2. Equal to _____ **meters**



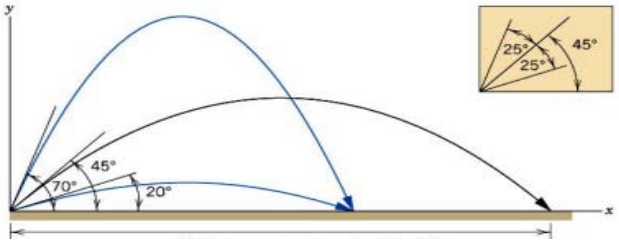
C. Range

1. Path of projectile forms _____ (neglecting air resistance

2. Horizontal range changes with _____ of launch

a. _____ **degrees** gives **maximum** range

b. Some angles yield same range (i.e. ____ and _____ degrees)



D. Speed- If we take into account air resistance, range is _____ and path _____ true parabola.